Active Millimeter and Submillimeter Sensing Applications

Completed Technology Project (2012 - 2012)

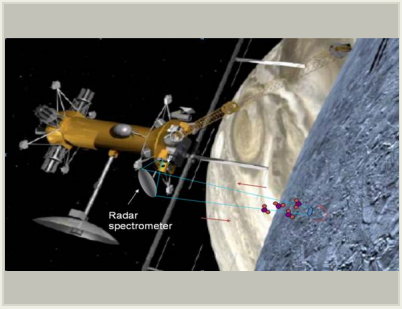
Project Introduction

The utilization of active long wavelength (>10 cm) microwave techniques mostly in radars has been a central aspect of planetary and Earth science instrumentation for several decades. The millimeter and submillimeter wavelengths are suitable for directly detecting gas, small particulates and small changes in dielectric constants. This opens the possibility of novel new systems to study aerosols, cloud physics, particulates such as ice crystals, and make precision velocity measurements.

The workshop will have three main objectives. The first will be to inventory the signatures and measurements that are desirable to make using submillimeter active systems. The second will be to derive the minimum requirements that would make such measurements competitive relative to the present state of knowledge. The third and final one will be to compare what is needed relative to the presently available capability to determine where immediate opportunities are, where short term investment could generate opportunities and areas where breakthroughs are still necessary before suitable systems could be built. There is a great deal of expertise distributed between various groups doing different kinds of research that does not generally lead to a discussion of possibilities outside the research area. The workshop will bring these diverse groups together with the intention of exploring the entire parameters space of scientific and technical possibility. Some potential applications include characterization of aerosols and particulates in atmospheres, dust in the solar system, molecules in atmospheres or exospheres, materials characterization, non-invasive inspection and remote surface characterization. The workshop will collect potential advocates and align them with those developing technology to illuminate areas where technological advances would lead to systems and to areas with systems leading to new science could be proposed using existing technology.

Anticipated Benefits

None.



Project Image Active Millimeter and Submillimeter Sensing Applications

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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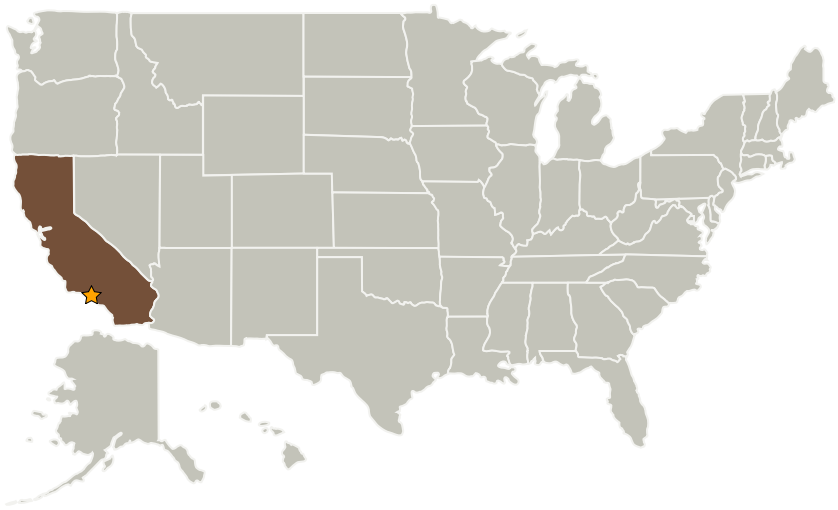
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California

Co-Funding Partners	Type	Location
California Institute of Technology(CalTech)	Academia	Pasadena, California

Primary U.S. Work Locations
California

Project Management

Program Director:
Michael R Lapointe

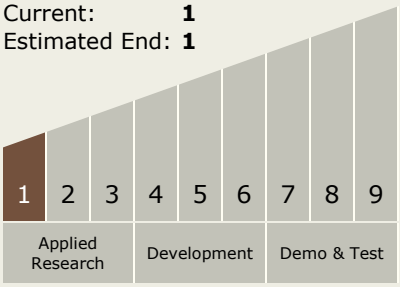
Program Manager:
Fred Y Hadaegh

Project Manager:
Jonas Zmuidzinas

Principal Investigator:
John C Pearson

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **1**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.5 Electromagnetic Wave Based Sensors

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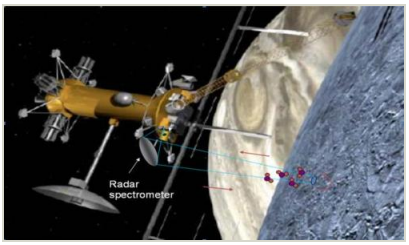
Images



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Project Image Active Millimeter and Submillimeter Sensing Applications
(https://techport.nasa.gov/image/1180)